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JUNE, 1937.

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JUNE, 1937

Editorial

THE CORONATION HONOURS.

THE profession will notice with pleasure that recognition for distinguished services rendered to veterinary science has been acknowledged in the Coronation Honours by the conferment of knighthoods on Mr. P. J. L. Kelland and Colonel Arthur Olver; whilst Mr. Frank Ware has been made a Commander of the Order of the Indian Empire and Captain Robert Daubney has been made a Commander in the Civil Division of the Order of the British Empire. These gentlemen are all well known to their brother members in the profession in this country, and it is noteworthy that the two former were comparatively near neighbours in boyhood days, one having been born in Devonshire and the other in Cornwall, and each serving pupilage with a practitioner in the West Country.

Sir John Kelland, as he will be known to us in future, has been Chief Veterinary Officer of the Ministry of Agriculture and Fisheries during the last five years, having assumed the duties of that office on the retirement of his predecessor, Sir Ralph Jackson. Graduating from the London College in 1901, he saw war service against the Boers in South Africa, acting as Civil Veterinary Surgeon to the Forces out there. Upon his return to England he was appointed to the staff of the Ministry of Agriculture as Assistant Veterinary Inspector, and since then has passed through the necessary grades until his selection as Chief Veterinary Officer placed him on the highest pinnacle. His keenness

and tactful capability were especially shown when he was appointed as the officer of the Ministry to deal with the traffic which included at that time the export of old and decrepit horses to the Continent for food and other purposes; and it was largely due to his forceful energy, backed up by the outcry of the humane societies and the general public, that this disgraceful traffic was stopped, and placed under the control of the veterinary officers of the Ministry of Agriculture and Fisheries. It is not too much to say that there was no officer of the Ministry who spent more time travelling on those comfortless horse boats in all weathers and at all times of the year than did Mr. Kelland, and the animals owe much to him for the present comfortable and well-organised condition of the ships in which horses are now transported abroad from Great Britain. His experience as a veterinary surgeon who had spent his life amongst animals and their owners stood him in good stead for the practical knowledge which it placed at his disposal when he became the head of the Veterinary Division of the Department.

Sir Arthur Olver bears a name which is not only very well known, but is much honoured in our profession, especially by students who had the good fortune to come under one of the family, Mr. Harry Olver, of Tamworth, in the endeavour to pass the final examination, of which he was for many years the examiner who took over the cattle side. Sir Arthur Olver took his diploma from the London College in 1897 and his Fellowship in 1909, by which time he had made considerable headway in the Army Veterinary Service. Like Sir John Kelland, he served in the South African War, where he was staff officer to the late Sir Frederick Smith, obtaining the Queen's Medal with five clasps. In 1906 he was seconded for service with the Egyptian Army, to which he was appointed Principal Veterinary Officer; passing on to the Sudan, where he did Trojan work in connection with the cattle service, and by the initiation of the Civil Veterinary Service of that country. In 1914 he was on Sir John Moore's Head Quarters staff as Assistant Director of Veterinary Services, being awarded the C.M.G. for distinguished service, and in 1917 he was specially selected for duty in America in connection with remount work; assisting also in an advisory capacity to start the Army Veterinary Corps of America on similar lines to that which was working so well in the British Imperial Forces. At the end of the War, after a period of service in India, Colonel Olver retired, having previously been awarded the C.B., and was at once appointed as Animal Husbandry expert to the Imperial Council of Agricultural Research in that country. Although the appointment was only an experimental one, Colonel Olver's services were so much appreciated that on the expiration of his period of office he was asked to continue, and there is much which can be traced to his influence in the establishment of numerous schemes in which veterinary aid can advantageously be applied in that country to the benefit not only of the animals, but their owners; and to agriculture and animal husbandry in general. It is to be hoped that he will be allowed to see the fruition of his labours, for it would be difficult, if not almost impossible, at this stage to replace him.

His indefatigable colleague, Mr. Frank Ware, who is officiating expert adviser

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in Animal Husbandry to the Imperial Council of Agricultural Research whilst Sir Arthur Olver is on leave in England, and Director of the Imperial Veterinary Research Institute at Muktesar has had conferred upon him the Commandership of the Order of the Indian Empire; and it is a choice which will be received with pleasure by his numerous colleagues not only in India, but in this country too.

Captain Robert Daubney, Chief Veterinary Research Officer, Kenya Colony, has been for some years in control of the Chief Veterinary Laboratory in that country at Nairobi. His name is world-wide known, particularly for his researches into the ravages made upon animals by a certain group of parasites upon whose life history and the method of short-circuiting thereof he is the acknowledged British authority. Coming of a slightly younger generation than his fellows in the Honours List, he has many more years ahead of him in which to look forward to an extended brilliant career.

DR. IAN CLUNIES ROSS.

BRITISH veterinary surgeons will welcome the appointment of Dr. Clunies Ross in London as the representative for Australia on the International Wool Publicity and Research Secretariat. His career at the Sydney University Veterinary College has been brilliant from the start, and that he should have been selected for this high position whilst still in the thirties is proof not only of his high abilities as a veterinarian and judge of stock, but also of his necessarily tactful and energetic personality. A great traveller, he has already visited this country and many of the laboratories on the European and American Continents. It is to be hoped that when the takes his residence in this country we shall see something of him at our veterinary meetings and congresses.

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General Articles

THE NATION'S BEEF SUPPLY.

By Lt.-Col. T. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M.
London.

AT such a time as the Coronation extra thousands of people had to be fed in London. Few people realise from whence the necessary meat was derived. Britain can only supply about 55 per cent. of the amount required for the total population in this country, and in London only about 28 per cent., the balance necessary being imported from many parts of the world.

Chilled beef, that is, beef transported at about 29.5° F., is now received from Argentina, Uruguay, Brazil, New Zealand, Australia, Union of South Africa, Southern Rhodesia, and occasionally from Canada ; mutton, lamb, pork and veal in the frozen condition, *i.e.*, carried at a temperature under 18° F., is also received from most of these countries.

The number of animals slaughtered daily to supply our nation's needs is colossal, *e.g.*, some meat works in our Dominions kill up to 15,000 sheep and lambs per day, while in Argentina 4,000 cattle are disposed of daily in one meat works. In Argentina alone there were killed in one year 3,233,797 cattle, 4,613,605 sheep and nearly 500,000 pigs. The question naturally arises, what guarantee has the British public that all the meat imported from these countries is free from disease? The reply is that such meat is more uniformly and scientifically inspected than most of our home-produced meat. Full control of the breeding, feeding and slaughtering of all the animals, including the ante- and post-mortem examination and hygiene of the overseas meat works is undertaken by the agricultural departments of the various Governments.

A brief description of the Argentine meat-production methods may serve as an example of the others.

In general, the animals are bred in the hinterlands, entirely in the open air, never under cover, thus ensuring good health. They are produced from the best breeds of British pedigree stock, purchased at very high prices, and sold when about a year old to feeders in the region of Buenos Aires. There they are fattened within six months on alfalfa and other special grasses, and sold to the meat works when about eighteen to twenty-four months old.

This open-air life in the final feeding grounds secures a greater freedom from disease than the house feeding and closer contact with one another which is the custom in cold climates such as ours. Various Government officers have visited the Argentine and investigated the system of inspection. The deputations from Britain, U.S.A., Sweden, South Africa, Holland, France, etc., unanimously reported

as being satisfied with what they saw. As an example of the vast trade carried on, some feeders produce 1,000 cattle per week to the meat works. When a feeder has a number of animals for sale he notifies the meat works; a reviewer visits the estancio, and after the "mob" has been "culled," a price per kilo is agreed; but before the animals can be sent to the meat works they must be seen by the local Government veterinary officer, who, if satisfied as to apparent absence of disease, grants a health certificate valid only for two days, and this must accompany the animals to their destination.

On arrival, this certificate is presented to the Government veterinary officer in charge, the animals are all weighed by a Government officer and a "weight note" supplied. The Government has thus a record of: (*a*) the number of animals sent to the meat works; (*b*) producer's name and address; (*c*) weight of the animals; (*d*) price paid per kilo.

The works Government veterinary officer examines carefully the consignment of animals, and if satisfied as to their condition, they are admitted to the works to be slaughtered after thirty-six hours' rest. If, however, evidence of disease is observed, the animals are not slaughtered for export, and a report is at once sent to the Government veterinary officer of the district from which the animals originated. Prior to slaughter the animals are bathed in order to cool them down and cleanse the hides, thus ensuring as far as possible cleanliness while the hides are being taken off.

A large staff of veterinary inspectors with assistants are on duty in the meat works, and a systematic examination of every carcase and its associated organs takes place; any doubtful carcase and its organs are specially "tagged" and run on to a separate rail to receive careful examination.

The inspectors are Government officials, who are wholly independent of the meat works proprietors, and they are in complete control as to when killing shall begin, the rate at which the animals are being killed, and when killing shall finish. All meat passed as fit for human food is stamped or labelled in their presence, and that found unfit for food is also disposed of under the same strict control.

The water supply is tested from time to time as to its purity, and the general hygiene of the whole establishment is kept under constant supervision. The meat is enclosed in wrappers prior to being loaded into the ships and the meat chambers on board have to be passed as satisfactory.

If any meat is discovered unsuitable after its arrival in this country the local authority notifies the representatives of the country concerned, and a report is sent to the department, so that a check is constantly kept on the efficiency of the inspection at the place of origin.

The supply of imported meat enables the British public to obtain cheap and good food which many people could not purchase if only British produce was available.

The question may arise in the minds of purchasers of imported meat as to its

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food value compared with that of home-killed animals; the following facts derived from tests carried out by an eminent firm of analysts will supply an answer to that query.

	Argentine chilled beef. Per cent.	English beef. Per cent.
Average gross loss of weight	25.7	24.5
Average net loss of weight (taking account of dripping and gravy)	15.1	14.6
Mineral matter in wet lean meat after cooking ...	1.12	1.07
Undigestible matter (calculated on dried lean) ...	19.3	19.6

The analysts conclude their remarks as follows: "The differences found are so slight that it would be safe to say that meat from both sources is equally economical, quite apart from price."

Price is a very essential consideration in the feeding of a family, especially where the food values are equal, and one has the striking example of Argentine rump steak at 1*s.* 6*d.* per lb. as against the English article at 2*s.* 4*d.* per lb.

REDWORMS IN HORSES.*

By IVAN W. PARNELL.

Lecturer in the Institute of Parasitology, McGill University, Canada.

(*From investigations conducted with financial assistance of the National Research Council of Canada.*)

In these modern days, when applied veterinary science has abolished most of the great epizootic diseases of horses in Great Britain, few people realise the enormous amount of damage being done by worms of various descriptions. It is safe to say, indeed, that more damage is done to horses by worms than by all the other causes of disease combined.

There are many different kinds of worms living parasitically within our stock; no animal is free from them, but none suffers more than the horse. These worms are in no way related to the earthworms of the soil, the lug worms of the fisherman or the cut worms of our crops. In fact they have no well-known free-living relations. Those parasitic in horses are generally classified as round-worms or flat-worms; the latter being subdivided into tapeworms and flukes.

The flat-worms of the horse are relatively unimportant. Two species of tapeworms occur in the United Kingdom, one in the small and one in the large intestine. Both of these are quite small forms. That in the small intestine is probably completely harmless, although the somewhat larger species found in the large intestine quite frequently cause small ulcers. If the formed droppings which are passed by a horse have any fresh blood on their outer surface the

* Reprinted from *The Field*, with the kind permission of the Editor.

animal from which they came probably harbours some tapeworms in its large intestine.

The round worms of horses are very much more important. The most easily seen is a large, yellowish, round worm—sometimes a foot long—which is often passed in the droppings. It does not appear to cause much trouble in the animal, although undoubtedly it must interfere with the development of foals and young horses generally.

More serious and more common is the pin-worm, a whitish, round worm with a long pointed tail, which is often seen in the animal's droppings. When it is living in the large intestine it is doubtful if this form causes very much trouble, but it has a peculiar method of egg-laying which produces quite a severe skin irritation. Most worms lay eggs continuously while they are living inside the animal. This species, however, retains the eggs in the body of the female until she is gravid, then she (herself) leaves the intestine and deposits her eggs—all at once—on a few of inches of the skin around the horse's tail. These eggs are covered with a very sticky fluid, which causes itchiness and makes the horse nervous and irritable. The itchiness is often so extensive that the hair is completely rubbed off the skin around the tail by the horse attempting to reduce the irritation.

All these forms are relatively unimportant compared with that group of small round worms known variously at Sclerostomes, Redworms or Palisade worms. About forty species of these are known in horses, donkeys and mules. Some are about 2 inches long, others are almost microscopic; all live as adults in the large intestine where some feed on the lining of the intestine, others feed on its contents, while others are actually cannibalistic. The sexes are separate and the females lay eggs—microscopic, thin-shelled bodies which pass out in an unhatched condition with the animal's droppings.

Provided the droppings remain moist (as they always do in ordinary circumstances) and provided the atmospheric temperature does not fall below 50° F., minute larvæ develop within the eggs (one to each egg), and in due course break the shell and move about freely within the droppings. They feed on bacteria and other material which they find there, and grow and moult. After moulting they resume their feeding, and in due course moult a second time, about a week after the eggs first reach the exterior. On this second occasion, however, they do not escape from the cast skin, but retain it as a protective sheath. This prevents their feeding and they remain in this stage until they are able to gain admission to another horse. This stage, in consequence, is called "the infective stage," because it alone is capable of carrying infection to a new animal. It gains admission to its host by being swallowed in the food, and until it is swallowed by one of the horse family cannot develop further. If, for example, it is eaten by a cow or sheep it is digested just as any other food would be. Once within the horse, the protective sheath is thrown off and the young worm continues to develop.

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This parasitic development depends to some extent upon the particular species of redworm. Some migrate extensively all over the body, and young worms have been found in practically all parts of the animal. One species is very commonly found in the large blood vessels serving the intestine. There their pressure causes a blood clot to form which interrupts the blood supply, and is a very common cause of colic.

This particular worm is so common that it is rare to find at a post-mortem examination a horse which does not show some alteration of these blood vessels. Other redworms do not migrate so extensively, and many, particularly the small forms, simply burrow into the lining of the intestine where they form tiny cysts about the size of a pin's head. During these migrations further development takes place, and ultimately the worm returns in all cases to the large intestine, where it settles down to develop to maturity and produces more eggs.

There are several important principles involved in this life cycle which have a general application to worm disease in our stock animals. Firstly, the worms are all more or less specific ; horse worms will develop in no animals others than those of the horse family ; pig worms will seldom develop in animals other than pigs, and so on. Secondly, no worm is capable of multiplying within the body of its host ; one young worm taken in the food will become one adult worm, and one adult worm only. Thirdly, all young stages of these worms must leave the host before they can develop further, and in the case of the forms found in the British Isles do so in the animal's droppings. Fourthly, a certain essential development must take place outside of the body before they can re-enter the same or another host. This not only takes a certain minimum time, which is quite constant for each species, but must go through a certain definite series of stages. Finally, no alteration of the life cycle can take place ; the worm must go through the various stages of development.

These general principles are of very great importance, as they not only explain how disease caused by worms occurs, but how it can be prevented.

Redworms damage the horse in many ways: by destroying its tissue, by removal of blood, by forming cysts in the gut wall, by cutting off the blood supply to the intestine and by blockage during their migrations in various important organs. The symptoms caused by these naturally vary. When blood clots are formed in the vessels serving the intestine, colic is caused. When cysts are numerous in the intestinal wall, diarrhœa and various disturbances of the bowels are frequent and often severe. When many blood-sucking forms are present, anæmia results, and so on.

As a general rule these symptoms are chronic rather than acute. The damage is perhaps not very extensive at any one time, but it is continuous and the net result is loss of condition, stamina, of power to work, which, in the course of a year, causes very considerable loss to the animal's owner. Moreover, the general interference with health reduces the resistance of the horse to other diseases and makes the indirect damage nearly as great as the direct.

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Redworms in horses are universal. It is exceptional to find a horse entirely free from them. It is common to find them very heavily infested. Town horses, as a rule, are not so heavily infested as country horses, but even in them a very large number of worms is frequently found.

We know of several drugs which can be safely administered by veterinary surgeons to horses and which will remove all, or practically all, of the fully developed worms. We know of no drug which is of any use against the young forms which are migrating in various parts of the body. Our study of the life history has shown that it is at this period that most of the damage is done. Consequently, as we cannot " cure " this damage, we must take steps to prevent it. The drugs mentioned also play a part in prevention as well as in the cure, because by the destruction of the adult worms the number of eggs which leave the horse is reduced and consequently the chances of infection to other horses are also reduced. Hence drugs are a valuable measure of prevention as well as of treatment.

We have seen that in every case it is essential for the eggs to leave the body before they can develop into forms capable of infecting another animal. Consequently any form of prevention must aim at breaking the life cycle at some point or points between the time when the egg leaves the body and the larvæ are swallowed by the horse.

It will be recalled that the stages outside the body consist of the egg, the free feeding and the infective larvæ, and it is necessary to consider the biology of these various stages before a practical system of prevention can be understood.

The eggs normally hatch very quickly, but under adverse conditions, such as extreme cold, they remain alive in a dormant condition for many months, developing only when conditions become suitable.

The free-feeding larvæ are much more easily destroyed, but even here the risk of death is not so great as it would seem, as only a few days elapse between the time of hatching and the time the larvæ become infective. Once it is infective it has enormous powers of resistance.

Infective larvæ have been found alive in the dust on the windows of stables which have been closed for two years. They have been recovered from soil where they have lain for four years, both in countries such as the United Kingdom and in some of the mid-western states of the United States of America, where the temperature range is as great as 150 degrees.

This long life and resistance to drying and climatic conditions is a relic of the days when the horse was a free-living animal on the steppes. Larvæ deposited in a pile of droppings would have to remain in that position for an indefinite time before the horse again visited that exact spot, consequently, in order to survive, the parasites had to develop such a resistance. Civilisation has changed all that. Horses are now confined to a relatively limited area and their droppings are concentrated in a spot which is frequently revisited. The hazards of the redworm's life have been practically eliminated and, instead of the comparatively

light infections which the horse used to accumulate, heavy infestations are the result.

This study of the bionomics of the free-living stages of the redworms shows that prevention must be concentrated either on the disposal of the manure or on the cleanliness of the horse's feed. This cleanliness, parasitologically speaking, is very difficult to attain. Most horses, normally, are eating the material on which their droppings have fallen. And so the most hopeful means of prevention narrows down to some method of disposing of the manure so that larvæ will not have a chance of re-entering the horse. This may be accomplished by carting it and placing it on areas on which horses will never be grazed. This is seldom practicable, except for very limited areas. It might also be spread out in the sun and dried. This has been done in countries such as the Anglo-Egyptian Sudan, where the climate is extremely dry and the temperature very high. Horse sclerostomes under these conditions are rapidly sterilised by the heat and dryness. It is quite impracticable in a country such as the British Isles.

It is, accordingly, necessary to attack this question of manure disposal in some other way, and to evolve methods which would not only be effective, but would be practicable and economical. Manure is deposited by the horse in the stable or in a field. In the stable it is collected into a manure heap ; in the field it is allowed to lie where it has fallen. The most obvious point of attack is the manure heap. Here redworm eggs are concentrated in the largest number and, if this manure can be controlled in some way, a large percentage of those larvæ will be prevented from re-entering a host.

Manure control is the key problem in the prevention of disease caused by worms, not only in horses, but in all our stock animals. It is obviously more easily applied to a horse, however, because of the fact that they are more carefully stabled than most of the others. In the stable, manure can be carefully collected and removed, and good stable hygiene will remove the greater part of the infective material. The manure will be stored in a manure heap and ultimately will be distributed on fields and pastures. If this manure could be so treated that all the worm eggs or larvæ in it could be destroyed, a large source of infection could be eliminated.

Considering the importance of this factor in the control of worm diseases, it is surprising how little attention it has received from research workers. Two institutes have in recent years, however, carried out a considerable amount of work on this subject from two different points of view.

The Bureau of Animal Industry in the United States has studied the effects of the heat of fermentation on redworm larvæ in manure and has shown that in a well-made midden, sufficient heat is generated to kill all, except those in the outer six inches ; to kill these, the outer portion must be turned in after a few days to receive the effect of the inner heat. A special " manure box " with double insulated walls has been designed to avoid this turning-in, and a steam-heated

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box is being tested. This method appears to be effective, but it is obviously not generally applicable on account of expense.

The Institute of Parasitology of McGill University (which is supported by the National Research Council of Canada) has also had this subject under study for the past four years, but from the chemical point of view. It is attempting to find suitable chemical substances which can be added to manure and which will destroy the redworm larvæ therein. These substances must be cheap, must not damage the manurial value, and must be harmless to stock.

About 5,000 experiments on a great variety of substances have been tested already, and although the work has really just commenced, many interesting data have been collected. The most economical substance appears to be the horse's own urine, added to manure at the rate of 2½ gallons for every 100 lb. of *fresh* droppings. Even in a well-drained stable, however, this is a large amount of urine to collect, and, if available, cows' urine may be added to make up the necessary quantity ; it is, however, not quite so potent, and to be on the safe side, double the amount of cows' urine should be used. If cows' urine is not available, the top, sides and bottom of the midden should be treated first, the whole mass being tightly packed to allow the heat of fermentation to kill eggs and larvæ in the middle.

If urine is not available the next most economical substance to use is a suitable artificial fertiliser, since some, if not all, of the cost may be recovered in added manurial value. Again, the amounts which have to be added would be excessive if all the manure had to be treated, instead of only the outsides. Which fertiliser is the most practicable to use will depend on relative costs, on the type of crops, and on the type of land to which the manure is to be applied.

The nitrogenous fertilisers can be mixed with the manure dry or in solution, but intimate and continued contact between the eggs and the fertiliser is essential. Intimate contact is most easily obtained with weak solutions; continued contact with the fertilisers in a dry condition—which is the most suitable—must depend upon local circumstances, including the carefulness of the labour available. The addition of bedding will increase the difficulty of mixing and increase the amounts of fertilisers required.

Urea, which has a nitrogen content of about 45 per cent., is the most lethal fertiliser yet tested. To treat *fresh* droppings, about 1½ st. of the *dry* fertiliser must be used to every ton of *fresh* droppings, while in medium strength solutions, only slightly over 1 st. need be used. Calurea also has practical possibilities, about 2 st. being necessary for each ton of horse droppings. Calcium cyanamide has been recommended for the same purpose in Italy, but is less lethal ; in the powdered form 3 st., and in the granular form about 4 st., per ton are necessary. It may also be used mixed with large quantities of water (but not with small quantities, as it does not readily go into solution) ; initmate mixing would, however, be difficult.

In addition there is a large group of nitrogenous fertilisers whose lethal values

vary slightly, but of which approximately 1½ cwt. would be necessary to each ton of fresh droppings ; this group includes, in order of potency, calnitro, potassium nitrate, sodium nitrate, calcium nitrate, ammonium sulphate, diammonium phosphate and nitro chalk. Of ammonia carbonate, about 3 st. and almost 6 st. of ammonia chloride (slightly less if used as a weak solution) would be necessary.

Of the non-nitrogenous fertilisers, a high-grade kainit is the most effective ; it should be used at the rate of slightly under 1 cwt. to each ton of *fresh* horse droppings ; this fertiliser has the advantage that it tends to fix the ammonia in the manure. Muriate of potash is only slightly less lethal. Both these fertilisers are naturally occurring salts which vary in their composition, and therefore, presumably, in their lethal potency.

Carbonate of potash is approximately equal to the group of seven nitrogenous fertilisers mentioned above. Sulphate of potash has some lethal value, but it is so low and so irregular that its use cannot be recommended. Raw rock phosphate and basic slag also are valueless for this purpose. Superphosphates have some value, a 20 per cent. grade requires to be used at the rate of 4 cwt. per ton, while a 16 per cent. grade is only half as potent, and under almost any circumstances would be outside the range of practicability. Ground limestone has no lethal value, and chemically the value of both hydrated lime and quick-lime is extremely low. Although the heat of the reaction between manure and quick-lime will kill eggs and larvæ, it may, if sufficient is added, completely destroy the manure—even a small quantity of lime drives off ammonia—and so lime cannot be recommended.

In addition to artificial fertilisers there are other substances which are lethal to redworm eggs and larvæ, but only in exceptional circumstances will their use be economically sound. Borax is included in this list ; it is highly lethal against redworm eggs. The addition of borax to manure heaps has been recommended for the control of flies—a most essential practice in good stable managements, since flies, in addition to making horses restless, carry certain stomach worms to horses.

Unfortunately, although borax is an essential element of plant nutrition, excess is very toxic to plants and persists in the ground. For fly control, therefore, the use of only 1 lb. per ton is recommended—a quantity which could not be relied upon to kill redworm eggs—with not more than 13 long tons of treated manure applied to an acre. Hellebore, which is also recommended for fly control, has no lethal potency against round-worm eggs. Common salt is the substance which has been used most frequently for controlling allied worms in man—especially in mines where manurial value is of no importance. Its lethal potency is somewhat similar to that of kainit.

Copper sulphate has been recommended for use on fields, but it and iron sulphate are extremely slow-acting and have to be used in excessive quantities. Since redworms cause symptoms of anæmia the value of other iron salts is at present being tested.

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There are other chemicals lethal to redworm eggs, such as paradichlorbenzene (which only requires to be used at the rate of about 6 lb. to 1 ton), bleaching powder (1½ cwt.), potassium xanthogenate, zinc and iron chlorides, etc., which might, but, with the exception of paradichlorbenzene, are unlikely to be used for sterilising middens.

Little work has been done on the control of worms on pasture and arable land, and the facilities for this work are at present so limited throughout the world that it is possible only to make tentative suggestions and to draw attention to the vast importance of the subject to all live-stock owners throughout the world.

As pastures cannot be treated daily, like a manure heap, it is practically always the infective larvæ which have to be killed. Apart from the high power of resistance possessed by infective larvæ, if on grass, they are in positions where it is difficult to bring chemicals into contact with them all; while if they have migrated into the soil, another series of problems is presented.

For pasture treatment, copper sulphate, bleaching powder and lime have been suggested; it is unlikely that any of these substances will prove to be the most satisfactory. Artificial fertilisers have been tested on small plots, and while large quantities of the most potent are lethal when applied during the egg or free-feeding stages, some infective larvæ survive in quantities large enough to damage grass.

To speculate, the greatest hope appears to lie in some chemical which can be used as a gas, and retained in and on the ground by mulching paper, as is done in the tropics for the control of plant eelworms. Paradichlorbenzene, carbondisulphide chloropicrin (a tear gas) and even that very dangerous gas, calcium cyanide, may prove of value; they are all lethal to redworm eggs. Alternatively, it may be possible to use a deliquescent salt, either alone or mixed with a very lethal chemical, so that as the larvæ migrate down the grass after sunrise they are attracted to the lethal chemical by the moisture of the deliquescent salt.

Until a more efficient method is found, probably the only effective way of dealing with pastures is to collect all the droppings *daily*—before the larvæ have time to migrate on to the soil and grass. Obviously, this form of control on pastures would only be practicable in small paddocks or where valuable horses are grazed.

As larvæ can be blown about in dust, it is more than possible that riding schools or dusty yards may be a source of infection. There will be no question of "residual value," and so some chemical must be chosen which is cheap in proportion to its lethal potency. Furthermore, it must remain in contact with the larvæ for some time, in spite of being exposed to the air. In treating a manure heap, the time taken for chemicals to kill is automatically exceeded; on exposed larvæ it has to be provided for.

The sterilising of stable walls, floors, mangers, etc., is an extremely difficult problem. Heat is the most certain of the methods at present known. The naked flame of a blow-lamp is the easiest method, but the danger of fire in a

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stable is practically always too serious a hazard. Steam under pressure is good, but is seldom available, and a very thin covering of horse manure is sufficient to protect larvæ from it for many seconds.

The use of many disinfectants is apt to give a false sense of security since infective larvæ are peculiarly resistant to them, whereas the user believes he has killed them. Infective larvæ in fæces will live actually in 2 per cent. permanganate of potash for over nine weeks, in 2 per cent. lye just over twenty-four hours, in 2 per cent. lysol somewhat less, and in 2 per cent. creolin over seven hours. A commercial variety of Dakin's solution has no lethal value, even at 10 per cent. In Germany, milk of lime, 1 per cent., alkalysol and carbolineum have been recommended for stable walls, but the former certainly is no safeguard.

Theoretically, one of the most practical methods of controlling these worms in livestock, whether at pasture or stabled, will be to incorporate in mineral licks some drug which the animals can and will take daily and which will kill the infective larvæ as it moults in the stomach; there also should be incorporated in the licks some tonic—such as an iron salt—which will help in the repair of the damage caused by worms which survive. In spite of much work and many hopeful ideas, this lick has not yet been evolved. A lick of this nature would also be of inestimable value for wild animals—including deer—which cannot be dosed in any other way. At present the most helpful advice which can be given horse owners is:

(1) To have their animals dosed regularly, especially in the spring just before they are put out to grass, so that the pastures are contaminated as little as possible. As there are contraindications for the use of the two most successful drugs against redworms (oil of chenopodium and carbon tetrachloride), dosing should be carried out only under the supervision of a veterinary surgeon.

(2) To treat all horse manure which will be put on to land where horses are to graze within three or four years.

(3) To feed stock from mangers or racks well above the ground and periodically to sterilise them.

(4) To remove all droppings from stables, including small fragments lying in cracks and corners, and to wash down, and if possible sterilise with heat, regularly, floors, walls, window sills and shelves, etc.

(5) Where possible, to remove droppings from pastures daily; to rotate grazing between horses or cattle and sheep, since if cattle or sheep swallow redworm larvæ, the larvæ are killed; and, finally, not to allow animals to graze before the dew is off the ground, since at that time the larvæ climb highest on grass and are most frequently swallowed.

(6) To give preference to young animals where accommodation or labour is limited, as the danger is even greater in them than it is in mature horses.

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How to Detect Redworm Infection.

Eggs and larvæ are small and therefore difficult to detect, eggs particularly so, and their detection should be left to a veterinary surgeon, who has the necessary equipment. Infective larvæ are not only larger but active, which makes them easier to see, although even they, except with a very heavy concentration and an excellent light, are almost invisible without a magnifying glass.

The easiest method of detecting a heavy infection by examining for infective larvæ, is to put an ounce or two of fresh droppings, evenly spread, over the bottom of a clean glass jar, lightly covered ; the droppings should be absolutely fresh and not have touched the floor, otherwise they may be contaminated with harmless free-living worms, which are not parasitic, but exist everywhere and may cause confusion.

After the droppings have been kept in the jar in a warm and preferably fairly dark room or cupboard for ten days, the infective larvæ can be seen climbing on the sides of the jar, an inch or two above the droppings, usually in a network pattern. When the jar with the larvæ on it is held to the light and a magnifying glass used, the individual larvæ can be seen moving about, and with a good glass their characteristic long tails can be seen. Many outside influences may affect the number of larvæ which reach maturity, including fungi and moisture, therefore, if only a few or no larvæ are seen in any jar of droppings, a fresh sample should be taken from that horse, in case a heavy infection should be mistaken for a light one.

Unfortunately, it is difficult to describe what is a heavy infection ; only the experience of comparing jars of droppings from several horses can help. If the use of a good magnifying glass enables a rough estimate to be made by counting a small portion of the larvæ, an estimate of under 2,000 larvæ can be considered a light infection, and over 40,000 a heavy one. Up to 110,000 larvæ have been isolated for 1½ oz. of droppings. These figures indicate how quickly even a light infection can spread disease.

The determination of whether larvæ are numerous on mangers, walls or floors of a stable, on hay or on pasture, is not so simple, but should not be impossible for the average livestock owner. The principle involved in their detection is that larvæ swim when placed in warm water, but are heavier than water, and therefore, as there is little or no tendency for the larvæ to swim upwards, gradually sink, especially when they become inactive. Therefore the material to be tested (hay or scrapings from a stable, etc.) should be wrapped in small butter muslin bags, not more than 2 in. or 3 in. in diameter, and then put into water at blood heat (not hotter) and left for at least twenty-four hours, by which time the majority of the larvæ will have swum out and sunk to the bottom ; the addition of some hot water once or twice after the original water has cooled helps to stimulate the larvæ, but is not essential, and it has the disadvantage of washing down sediment—which should be avoided, as it may hide the larvæ later.

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At the institute this work is done in large glass funnels with a small piece of clamped rubber hosing at the bottom, so that by gently releasing the clamp a small quantity of water can be drawn off ; the first few drops contain the majority of the larvæ concentrated there. If a large funnel is not available a small one can be used. In this case the larvæ should be extracted in a bucket or other container, and after a minimum of twenty-four hours the top fluid is poured away and the bottom fluid poured into a smaller container. After the larvæ have had some hours to settle, the process is repeated until the quantity of the bottom fluid is sufficient to be held by the funnel.

After the larvæ have had time to settle in the funnel—there is no reasonable limit to the time they can be left—a few drops of the bottom fluid are drawn off on to a glass dish or piece of glass. Then, to distinguish the long-tailed redworm larvæ from the numerous short-tailed non-parasitic larvæ, a low-powered microscope or a very good hand lens must be used, with the larvæ illuminated from underneath.

Redworm larvæ are easily recognised by their long tails, if once seen, and it would probably make recognition more certain if some horse droppings were put in a glass jar, as described earlier, and the larvæ examined, before parasitic larvæ are looked for among non-parasitic species. It must, of course, be remembered that if there are only one or two parasitic larvæ on each armful of hay or grass, a horse may very rapidly pick up a heavy infection.

SLEEPY SICKNESS IN SHEEP IN NEW ZEALAND.

By JAS. M. McLINDEN, M.R.C.V.S., N.D.A.

Late Lecturer, Massey Agricultural College, University of New Zealand.

THIS affliction of sheep has long been recognised by veterinarians and stockmen in New Zealand. Of late years it has been given very much more consideration because it is now much more prevalent. On many farms, indeed, the losses arising from it are serious.

The popular name applied to this almost always fatal disturbance is very apt. It describes the condition admirably. It must be realised at once that it is not associated in any way with a disease bearing a similar name to be found in the human being. It is not an infectious disturbance. Many sheep in the same "mob" will show no signs of sleepy sickness provided adequate measures be taken in the handling of the stock.

Suitability of Country for Sheep Farming.—There is no doubt that this country is probably the finest grass land country in the world. That is, so far as wealth of growth is concerned. Growth can only be described as luxurious, particularly in the North Island. But this is not maintained for the twelve months of the year. The winter period produces a very marked check upon growth for about six or eight weeks. Such phenomenal growth over so long a period is only to be

expected when one realises the equitable temperature of the country and the splendid rainfall. Except for areas on the east coast of both islands, the rainfall average per month remains fairly constant: on these east coast areas drought conditions are experienced during the summer months, some years but not all. In all areas the growth of pasture during the autumn months is always well maintained. This fact the New Zealand sheep farmer relies upon and uses to his fullest ability for grazing purposes.

From what has been said it will be realised that the carrying capacity of an acre of New Zealand country (mountain country excepted) is very much greater than is to be found in England. On the great expanses of alluvial flats many farms are carrying from six to eight ewes per acre. (Exceptionally high-carrying land is known, but these farms are highly specialised.) Foothill country in the North Island will carry from two up to four ewes per acre.

Husbandry in New Zealand.—From this description, which is admittedly very rough and scrappy, it should be apparent that the New Zealand sheep farmer is in essentially a grazier's country. That is what he is. Feeding of sheep as we know it does not exist except on stud farms. Being a grazier, the sheep farmer in New Zealand is tempted to stock up as nearly as he dare to the greatest average growth on his farm. On the foothill country he has really no other alternative if he is going to keep his pastures in proper order. It would be utterly impossible for him to make hay or ensilage out of surplus grass on the majority of foothill farms, for hill country in New Zealand is very steep.

Observation.—At this point three important observations must be made: (1) There is always a reliable and excellent growth of pasture during the autumn. (2) The winter growth, whilst not at a standstill, falls very far short of the requirment of all the stock grazing upon it. (3) The grazier realises what is ahead of him as regards pasture insufficiency, therefore he brings his flock up to as heavy a condition as possible. The flocks always enter the winter in a very fat condition. The winter brings about a steady fall in the condition of the flocks right on through lambing. It is about this time that sleepy sickness makes its appearance.

Symptoms.—Almost always the affected animals are in-lamb ewes. On entering a paddock of ewes just before or during the period of lambing, one or two, or more, may be observed " blowing " with a slight sign of inco-ordination and a tendency to carry the head high. Some may even give the impression of impaired vision. In the same lot one may be fortunate in seeing a slightly further advanced example—standing slightly apart from the others, it will remain while it is approached with head hanging and ears drooping. When closely approached it may move off to the others, but with difficulty, and more often it falls and remains down till it is caught. As the condition is very sudden in its onset, the sheep are nearly always found down and unable to move.

In the early stages of sleepy sickness they lie in a perfectly normal recumbent position, but before long they lie on their side with legs stretched out. Whilst lying in the recumbent position the sheep can be approached with no difficulty

because it makes no endeavour to get away. In the vicinity of these sheep the writer has always observed a strange rancid odour. Where a number are gathered together the odour is more readily observed. It is very probable that this odour is from the breath, at least partly, because bowel movements are negligible and the breath is not normal, although it is not obnoxious. The pupils are slightly dilated and show no observable alteration on the eyes being alternately covered and exposed. There is no hypersensitivity as in " grass tetany " in dairy cattle. In fact the hypodermic needle can be used with ease, due to the almost entire lack of movement of the sheep. The majority of the sheep show to be very heavy in lamb and probably twins. No special breed or age of breeding ewe appears to be more conducive to this condition than another. The alluvial flats and swamp country show a higher percentage of cases.

Post-mortem Appearances.—The ewe is often carrying twins. Our experience did not lead to the belief that it was twinning which was responsible or that it was of great importance. Pregnancy obviously is an important factor, but not twinning. Those years showing a high percentage of twin lambs in a flock certainly did show a high percentage of twins in ewes on post-mortem. Those years which did not show a high percentage of twinning showed a similar state on post-mortem, but with a preponderance of twins. There is only one constantly abnormal feature, and that is in the liver. The liver is very friable : in some cases it cannot be handled without being damaged. Frequently the kidney and mesenteric fat is there in quite amazing quantities compared with the body fat.

Treatment.—It has long been observed that once lambing commenced the condition known as sleepy sickness quickly subsided. Treatment, based on that observation, quickly followed, and is still in use. An endeavour is made to produce abortion in ewes showing the symptoms by giving huge doses of molasses and Epsom salts. The writer's experience is that such treatment is of no practical use whatever. Leslie, of Canterbury College, used injections of mineral salts and found beneficial results. Our experience with this line of treatment was not at all encouraging.

Conclusions.

The points of outstanding importance, in our opinion, were the high state of condition all flocks are brought to during the autumn ; over-stocking of pastures during the short period of protracted growth in winter ; early lambing down before growth is properly restarted.

These points indicated the conclusion that the condition amongst sheep described as sleepy sickness was the result of katabolic processes, probably fat katabolism, which produced a condition of autointoxication. This does not ignore the possibility that mineral deficiency may and probably does play a very important part in its incidence. On many of the aliuvial farms it is admitted that growth had commenced for the spring. At first this was a difficult point to understand, because these farms had the greatest percentage of cases. Closer observation showed that the muzzles of sheep on such territory were always soiled with

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mud. This at first sight led to the belief that the sheep were eating soil, as happens with cattle in mineral-deficient areas. Post-mortem findings showed that this was not so. The mud on the muzzle is due simply to the fact that on the alluvial and swamp country farms the land at this season is frequently water-logged, and with the heavy stocking the grass quickly becomes trampled in, so that the soiling of the muzzle with mud is quite a natural consequence.

The advice given from the Massey College was to so adjust the management of the flock that the ewes would be maintained on a more level plane of nutrition from autumn until spring. Where ewes can be turned on to good pasture or a green crop, the condition known as sleepy sickness will disappear almost at once from the flock through the absence of further cases.

Clinical Articles

Poisoning of Sheep by Copper Sulphate.

By J. W. HALL MASHETER, M.R.C.V.S.

Newnham-on-Severn.

On Thursday, May 20th, 1937, at 12.30 a.m., I received a call to attend on a flock of ewes and lambs which had been dosed with $CuSO_4$ for tapeworms, that eighteen of the lambs were dead, and many others dying. On arrival, and on inquiry, I elicited that 57 ewes, 1 ram and 66 lambs constituted the flock, and that instead of a 1 per cent. solution of copper sulphate a 10 per cent. solution had been given. Thirty-two of the lambs were dead by 1.30 p.m., but no ewes, although many of the latter were in a bad state. Drenching had commenced at 10 a.m. By the morning of the 21st a further 15 lambs had died, and 7 ewes. One further ewe and one lamb died on the 23rd.

Symptoms.—Rolling gait or decubitus, or coma, grinding of teeth, salivation, moaning, green diarrhœa.

Post-mortem Appearances.—Those of corrosive poisoning. Abomasum (this appeared to be the only stomach affected). The sheep had been "fasted" for about fourteen hours. Intensely corroded and hæmorrhagic, bowels intensely inflamed, kidneys dark in colour and inflamed but firm, liver swollen, dark-chocolate coloured, with large hæmorrhages under the capsule, and very friable. Mouth and œsophagus inflamed.

Treatment.—Lambs.—Ten grains potassium ferrocyanide in two ounces of water, followed by white of egg and 2 ounces of milk. The latter was repeated every six hours.

Ewes.—One ounce of linseed oil and half-a-pint of milk three times a day.

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Discussion.

As will be seen, the initial mistake was a 10 per cent. solution of $CuSO_4$ instead of a 1 per cent. solution, and two ounces of the 10 per cent. solution means that these sheep and lambs got somewhere in the neighbourhood of 96 grains of copper sulphate each. As the solubility of $CuSO_4$ is about 1–3 of water, the solution of the salt would be complete.

" Twenty-two grains is a safe dose for sheep (adult) ; 45 grains and upwards causes death " (Lander).

As to antidote, " white of egg and milk form insoluble innocuous albuminates. Potassium ferrocyanide ($2K_4FeCy_6$) produces a comparatively insoluble and harmless salt " (Finlay Dun).

Having only sufficient potassium ferrocyanide for the lambs, I gave linseed oil and milk to the ewes, so that the treatment resolved itself into two categories, *viz.*, potassium ferrocyanide, white of egg and milk for the lambs, and linseed oil and milk for the ewes. The question then arises : Why was the mortality so much greater in the lambs than the ewes ? They all had a *fatal* dose of the solution, and the lambs, of course, had the additional protection of the mother's milk.

Could there have been (apart from the greater susceptibility of young tissues and a bigger dose relative to age) a greater protection from linseed oil than from potassium ferrocyanide ? Why, also, the doses being fatal doses, should eight ewes only have died (one could understand the greater fatality of the lambs)? Yet, at the same time, why should 18 lambs survive in addition to the 49 ewes and the ram ?

After reading " Cod-liver oil as local treatment for external affections of the eyes " (Stevenson), and " Observations on the external use of cod-liver oil " (George Dykes, *Vet. Rec.*, 21, p. 649, *et seq.*), I should have been tempted to try this on at least some of the ewes and lambs, but it was too late.

Vegetable oil appears to be more useful than potassium ferrocyanide, and it would have been intensely interesting to see the effect of a fish oil internally.

Delayed Parturition in Sow.

By J. W. HALL MASHETER, M.R.C.V.S.
Newnham-on-Severn.

An old sow had been in labour for two days and passed one dead piglet. Then I was called in, of course, about midnight. She was lying perfectly comfortably and answered when spoken to. The mammæ were much distended and milk was squirting in all directions. I made a manual examination to the extent of a rather long arm, but nothing could be felt except laterally. As there seemed to be no obstruction, I injected pituitrin and went away. Strong labour commenced after about twenty minutes, and lasted for twelve hours. A certain

amount of blood-stained fluid was passed at each straining. When the straining stopped the sow seemed to be completely happy and was obviously under the impression that " all was over." She fed and started grazing, and kept on feeding and appeared to be perfectly happy. The milk supply ceased and everything seemed to be all right, and I thought I had made a mistake as to there being more piglets. *Five* days afterwards she passes thirteen fœtuses all in a state of more or less putrefaction. The sow is still perfectly happy and unconcerned.

Abstracts of Current Literature

A Cure for Neuro-lymphomatosis. By T. DUNLOP YOUNG.

Officials of the University of British Columbia have announced the discovery of a cure for neuro-lymphomatosis poultry disease, which, it is said, caused a loss of £4,000,000 in Great Britain last year.—*Reuter.*

ACCORDING to John L. West, Kansas State College, Manhattan, Kansas, in *Veterinary Medicine*, neuro-lymphomatosis gallinarum, fowl paralysis, or range paralysis, was first reported by Marek, of Hungary, in 1907. Fourteen years later Kaupp reported the condition in this country, having observed it seven years previously. Pappenheimer and associates proposed the term neuro-lymphomatosis gallinarum, which signifies certain manifestations in the nerve tissues of fowls affected with a particular disease that is by no means confined to the nerve tissue, but may manifest itself in any organ or tissue. The disease has become widespread in this country, and is one of the outstanding menaces to the poultry industry.

Marek described the condition as an interstitial neuritis. In the light of recent investigations it appears to be an infectious, contagious and transmissible disease of mature or nearly mature fowls, characterised in the living state by paralysis or paresis of one or both legs or wings, and in some cases inability to support the head. On necropsy, infiltration, congestion and enlargement of the sciatic, brachial and vagi nerves are commonly encountered. In a great many cases there is a greyish discoloration of the iris, called the " pearly " or " fishy " or " grey " eye.

The disease is probably due to a filtrable virus. It has been transmitted experimentally from affected to susceptible fowls through the intraperitoneal, intravenous and subcutaneous inoculation with whole blood, blood filtrate, blood cells, and bacteriologically sterile emulsions of affected nerve tissue. Other factors thought by some investigators to be fully or partially responsible for the occurrence of the disease are tæniasis, ascariases, coccidiosis, and disturbances caused by the paratyphoid group of bacteria. Experimental results strongly indicate that several conditions, leucosis, erythroleucosis, pearly eye, certain

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anæmias, lymphoid sarcomas, and neuro-lymphomatosis gallinarum are but different manifestations of the same causative agent, or that they are closely related. One strain of virus upon its intravenous injection into susceptible fowls has consistently produced leucosis or lymphoid sarcomas, or both.

The attitude of the affected bird is more or less characteristic. The first symptoms noticed in a flock is lameness of one or two birds, although greyish discoloration of the iris is frequently the initial abnormality. These birds become progressively emaciated and are unable to move. Diarrhœa and atony of the crop develop. They finally die or are destroyed in one or two weeks. Later one or more of the other fowls become lame. It is seldom that more than two or three fowls are affected with paralysis simultaneously in the average farm flock. Iritis and glaucoma may be observed affecting a few or several apparently healthy fowls. Lameness may develop so suddenly that the owner suspects that the birds have been injured. One or both legs may be either partially or completely paralysed. They are sometimes fully extended either forward or backward, with inability to move them. The wings may droop so slightly that close observation is necessary to detect it, or they may be fully extended, and useless. The iris frequently shows a greyish discoloration and does not react to bright light, the pupils being irregular and contracted.

In the early stages of the disease the bird is usually in good flesh, but in the later stages it is emaciated, due to inability to obtain feed because of paralysis and of blindness. Atrophy of the affected limb or limbs is usually quite pronounced in birds that have been affected for some time. Paralysis of the neck, torticollis or opisthotonos is occasionally observed. Upon autopsy the great sciatic nerves, brachial plexus and vagi are found to be enlarged, congested, and of a colliquative appearance. The anterior or posterior trunks of the great sciatic, or both, may be affected, one branch being three or four times as large as the other. Ulcerative inflammation of the proventriculus has been regarded by some investigators to be due to paralysis of the branch of the vagus supplying it. One, two, or all three branches of the brachial plexus may be affected. The nerve may be swollen to four or five times its normal size in any part due to the infiltration with lymphoid-like cells. Loss of cross striations of the nerves may be the only deviation from normal.

Lymphoid sarcomas may be found in any part of the body. The liver, spleen, heart, intestine, ovary, and kidney seem to be the most frequent locations. Their size may vary from that of a pin-head to that of a medium-sized marble. They are convex, more or less circular in shape and greyish in colour. Their borders may be sharply separated from the normal tissues surrounding them. The centres of the larger sarcomas are frequently yellowish, contain fluid and are necrotic. The liver and spleen of the bird affected with leucosis are enlarged and are a greyish colour. The liver of one white giant cockerel weighed 460 grams; the spleen of a Rhode Island Red hen weighed 48 grams. Lymphoid nodules are frequently found in the liver and spleen.

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Not infrequently leucosis, sarcoma, and affection of the nerves typical of neuro-lymphomatosis gallinarum are found in the same fowl. The spleen and liver may increase in size so rapidly that the capsule is ruptured, the bird dying of internal hæmorrhage. The bichloride of mercury agglutination test and the modified Guttadiaphot test have been employed as diagnostic agents, but have not given consistent results.

Blood smears from birds affected with erythroleucosis show a great increase in the number of white cells, so that their ratio to the red cells may be one or two or three, or even more, instead of the normal one white to five hundred red cells. Smears made by rubbing the cut end of an affected nerve on a clean slide and stained by the modified Wright method show an accumulation of lymphoid-like cells in the nerves which are normally free of such cells.

All breeds of chickens show relatively the same degree of susceptibility to this disease; however, there appears to be a great variation in the susceptibility of different strains or families. A hybrid pheasant-chicken was artificially susceptible, but pheasant, geese, ducks, pigeons, turkeys and guinea-fowl are immune. The younger the bird the greater the susceptibility, the higher the mortality, and the shorter the period of incubation. Recent investigations suggest that chicks kept in brooder houses until five or eight weeks of age, then placed on range, were more susceptible than chicks kept under identical conditions, but placed on range at two weeks of age.

Symptoms of neuro-lymphomatosis gallinarum usually do not appear until the bird is five months old or even older, although occasionally typical changes in the nerves are seen in younger birds. The period of incubation is generally considered to be two or more months.

In addition to transmission by inoculation of birds there is considerable evidence that the condition may be transmitted through the egg to the offspring.

The disease usually, if not always, terminates fatally. Improvement may be noted in some cases only to be followed by a continuation of the symptoms and subsequent death. No method of treatment is successful. Improvement in sanitation is recommended as a control measure.

Antiseptics in the drinking-water, clean pens and houses, adequate and balanced rations, unlimited sunlight, etc., seem to lessen the prevalence of the disease. Careful selection of the breeding stock, judicious and frequent culling, with satisfactory disposal of all normal birds, and the purchase of chicks and setting eggs from flocks free from the disease tend to control the occurrence of neuro-lymphomatosis gallinarum quite successfully. Some of the experiments reported would suggest that the chicks for the replacement of an affected flock should be obtained from flocks that have a high resistance to paralysis, as indicated by negligible losses following an outbreak of the disease.

There are approximately two thousand fowls autopsied at this station yearly, about 10 per cent. of them being two weeks or less of age. The

following table indicates the number of such fowls affected with neuro-lymphomatosis gallinarum, leucosis, iritis, and lymphocytomas, from January 1st, 1925, to February 1st, 1936.

Year.	Neuro-lymphomatosis gallinarum.	Iritis.	Leucosis.	Lymphocytoma.
1936	112	87	72	37
1934–35	116	33	71	54
1932–33	20	27	50	33
1930–31	13	10	35	48
1928–29	33	0	7	23
1926–27	3	0	4	30
1925	0	0	0	0

Tuberculosis — Its Control and Eradication on the Farm. — *Penrith Observer.*

CAPT. R. SIMPSON, the Cumberland County Veterinary Officer and President of the National Veterinary Medical Association, lectured to the members of the Penrith Young Farmers' Club at Newton Rigg Farm School on the subject of the control and eradication of bovine tuberculosis. On evidence based on the administration of the Tuberculosis Order, he showed that the loss resulting from "advanced" cases of the disease amounted to approximately £250,000 per year in the country as a whole, and that the losses due to the condemnation of carcases of cattle and swine amounted to a further sum of approximately £500,000 annually. The total losses in condemned home-produced meat due to bovine tuberculosis, including animals slaughtered under the Tuberculosis Order, were therefore in the region of £750,000 per annum.

Estimates based on more general lines confirmed these figures: *e.g.*, it is known that 2 per cent. of dairy cows become "wasters," and their loss annually means £600,000 per year. Again, if a figure of £2 per animal is taken as representing the depreciation resulting from infection with the disease, and taking into account the known incidence of the disease, the annual loss through depreciation has been calculated at £2,000,000 per annum.

Apart from direct loss to the agricultural community, there has also to be taken into consideration the loss caused by human infection due to tuberculous milk, which cannot be assessed in mere figures. Apart from the death-rate, which is considerable, it is estimated that sanatorium and other forms of treatment cost the country £500,000 per year. The lecturer dealt in detail with the methods of spread of the disease and the common paths of infection. He stated that in Cumberland the general incidence of bovine tuberculosis was much lower in comparison with other districts, due largely to the fact that there were so many self-contained herds in the county, particularly in the essentially breeding districts of the county. He stressed the advantages of a self-contained herd in which the

heifer calves were reared, and also showed that such herds usually had a small incidence of tuberculosis The provision of good sanitary surroundings, with an absence of overcrowding, together with the provision of fresh air and sunlight, were just as important factors in controlling the spread of bovine tuberculosis as in controlling tuberculosis in the human population. These good byre conditions were required for the production of accredited milk, but would probably also decrease tuberculosis in cattle so housed. Such measures, if combined with periodic disinfection of buildings and the prompt removal of any " open " cases of the disease, were most useful in controlling the disease.

The lecturer then went on to point out the advantages of a tubercle-free herd, indicating how such herds were, as a rule, more healthy and free from other bovine diseases, and he also pointed out the pecuniary advantages to be obtained by the dairy farmer and the breeder who held either a tuberculin tested licence from the County Council or an attested herd certificate of the Ministry of Agriculture. The present attested herd scheme of the Ministry of Agriculture was criticised, but the hope was expressed that the amendments, which are likely to be made in the scheme in the near future, would give a much greater impetus to the establishment of tubercle-free herds. Pastures on which tubercular cattle had been grazing might be cleaned by good harrowing to break up and distribute the droppings, liming, and leaving for a few weeks to the action of the sun and weather.

Agricultural Production in Canada.—*Agricultural and Industrial Progress in Canada*, May, 1937.

THE value of agricultural production in Canada in 1936 was the highest since 1930. The increase in the gross value of production over 1935 was nearly 12 per cent., while the rise in net value was over 9 per cent. Dairy products stood second in 1936 at $208,238,000 as against $192,410,000 in the previous year; while farm animals, occupying third position, increased in value from $120,078,000 in 1935 to $130,886,000 last year; fur farming from $5,516,000 to $6,399,000; wool from $2,232,000 to $2,783,000; and poultry and eggs from $50,434,000 to $53,236,000.

Fur Farms of Canada.—A new record for the value of pelts sold from Canadian fur farms was set up in 1935. The number of silver foxes born on fur farms in that year was also the highest on record. The revenue from the sale of live fur-bearers was the highest since 1930. The Canadian fur-farm industry, which began in Prince Edward Island, has now spread through the Dominion. The fur farms are the source of approximately 31 per cent. of the total value of the raw fur production of Canada.

The number of fur farms operating in Canada in 1935, according to a report just issued by the Dominion statistician, was 7,495. Of these, 6,632 were classified as fox farms, and 636 as mink farms. Of the total number of farms, 2,408 were situated in Quebec, 1,029 in Ontario, 983 in New Brunswick, 853 in Nova Scotia,

and 771 in Prince Edward Island. In Western Canada, 463 farms were reported from Alberta, 400 from Manitoba, 308 from Saskatchewan and 272 from British Columbia. The total value of the fur farm property, including lands, buildings and fur-bearing animals, was $15,972,000 in 1935, as compared with $14,637,000 in 1934. Of the total value in 1935, that in Ontario was $3,170,000, Quebec $3,083,000 and Prince Edward Island $2,077,000. Of the remaining provinces, Alberta stood fourth at £1,990,000, followed by Manitoba, $1,613,000 and New Brunswick $1,457,000. The number of fur farms in Canada in 1934 was 7,019.

The value of the sales of pelts from Canadian fur farms in 1935 was $9,381,000 as compared with $8,427,000 in 1934. The silver fox was the source of over 90 per cent of the total value in 1935, sales of silver fox pelts being valued at $8,495,000 and the number sold being 141,509. Mink came next with sales of 31,946 pelts at a value of $695,000. Sales of patch or cross fox were valued at $65,000, red fox $16,100, blue fox $20,700, beaver $26,500, muskrat $20,800, fisher $16,400, raccoon $10,600, marten $6,400 and fitch $4,500. Of the total sales in 1934, the silver fox accounted for $7,742,000, with mink second at $451,000.

The number of fur-bearing animals born on fur farms in Canada during 1935 totalled 245,528, as compared with 203,491 in 1934. The number of silver foxes born in 1935 was 184,988 as compared with 155,043 in 1934 ; while the number of mink rose between these years from 35,375 to 48,961. The number of living fur-bearers sold from Canadian fur farms in 1935 was 14,526 at a value of $649,432, as against 13,839 sold in 1934 at a value of $573,051. Of the sales in 1935, silver fox numbered 9,901valued at $562,480, and the mink numbered 3,574 at $73,402. Fur-bearing animals on Canadian fur farms at the end of 1935 numbered 202,363 valued at $9,381,825.

A Brigadier-General for the U.S.A. Army Veterinary Corps.—*Veterinary Medicine.*

A BILL has been introduced into the U.S.A. Senate " To provide for adequate medical and dental service for individuals of the Military Establishment of the United States," which provides, amongst other things, for the appointment of five additional assistants to the Surgeon-General in the grade of Brigadier-General, three of these assistants to be officers of the Medical Corps, one an officer of the Dental Corps, and one an officer of the Veterinary Corps.

The Veterinary Corps of the Army is responsible not only for the maintenance of the efficiency of the animals of the Army and the inspection of the grain and forage purchased by the Army, both for quality and compliance with specifications, but also for the inspection of all food of animal origin used by the Army personnel. By direction of commanding officers, veterinary officers are often *charged with the inspection of food other than of animal origin*, both as to its wholesomeness and compliance with specifications. It thus has a heavy responsiblity : (1) to insure that the Government gets what it pays for in forage for its animals and food for the Army personnel ; (2) to conserve the animal strength of the Army and

maintain animal efficiency; and (3) to insure wholesome food for the Army personnel.

When the cost of forage and food for the Army, aggregating 75 million dollars annually, is considered, and when the importance of maintaining efficiency among Army animals and of wholesome food for the military personnel is weighed, it is evident that the Veterinary Corps merits a General Officer at its head. If any confirmation of this view is required, it is to be found in the fact that every Surgeon-General of the Army since the World War has officially recommended that the Veterinary Corps be given a Brigadier-General and has urged Congress to provide this grade for it by legislation.

Milk Sales in 1936–37.—*Farmers' Union News Sheet*, May 27th, 1937.

THE huge nature of the business operated by the Milk Marketing Board is shown in the report of the Board for the year ended March 31st, 1937, which has now been circulated to registered producers and will be received at the annual meeting of producers on June 10th. During the year the total quantity of milk passing through the Board totalled 1,011,882,000 gallons, some 20,500,000 more than in 1935–36. It is notable that of this increase in sales, some 12½ million gallons went to the liquid market and 8,000,000 to manufacture. Producer-retailers' sales amounted to 106,000,000 gallons, about 2¼ millions more than in 1935–36. It is notable also that the sales of accredited milk amounted to some 311,000,000 gallons, not far short of a third of the total sales. The report gives a considerable amount of information on other activities of the Milk Marketing Board, and is a very useful document.

Sheep in the U.S.A. and Canada.—*Veterinary Medicine.*

ACCORDING to *Veterinary Medicine*, the numbers of sheep in the following States are: Alabama, 47,000; Arizona, 847,000; Arkansas, 68,000; California, 3,407,000; Colorado, 1,587,000; Connecticut, 7,000; Delaware, 3,000; Florida, 39,000; Georgia, 34,000; Idaho, 2,104,000; Illinois, 704,000; Indiana, 782,000; Iowa, 1,253,000; Kansas, 385,000; Kentucky, 1,102,000; Louisiana, 248,000; Maine, 53,000; Maryland, 86,000; Massachusetts, 8,000; Michigan, 1,066,000; Minnesota, 960,000; Mississippi, 76,000; Missouri, 1,246,000; Montana, 3,353,000; Nebraska, 294,000; Nevada, 913,000; New Hampshire, 13,000; New Mexico, 2,037,000; New Jersey, 10,000; New York, 455,000; North Dakota, 740,000; North Carolina, 77,000; Ohio, 2,324,000; Oklahoma, 190,000; Oregon, 2,494,000; Pennsylvania, 462,000; Rhode Island, 2,000; South Carolina, 12,000; South Dakota, 1,334,000; Tennessee, 400,000; Texas, 7,092,000; Utah, 2,468,000; Vermont, 28,000; Virginia, 410,000; Washington, 675,000; Wisconsin, 450,000; West Virginia, 610,000; Wyoming, 3,341,000; Hawaii, 15,000; total about 51,000,000.

The chief breeds of sheep vary in different districts, the most common being

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Rambouillet, Corriedale, Hampshire, Southdown, Dorset, Cheviot, Shropshire' Lincoln, Merino, Cotswold, Oxford, Delaine. The most common troubles are stomach worms, poisonous plants, especially after a hard winter, and in some States the sheep-killing dogs.

Canada.—According to the Chief Veterinary Inspector (Lieut.-Colonel Cameron) there are 3,370,000 sheep in Canada.

Trichomonas Disease of Cattle. Review and Laboratory Data, by A. W. STABLEFORTH and N. J. SCORGIE; Description of Outbreak by G. N. GOULD. *Vet. Rec.*, 1937, Vol. 49, Nos. 8 and 9, pp. 211–224 and 247-257.

IN this article the authors draw attention to the existence of trichomonas disease of cattle in Great Britain, and describe the first recorded outbreak in this country. The causal organism is a protozoan, *Trichomonas fœtus*; the disease is contagious, transmitted by the bull, and characterised by difficulties associated with breeding, vaginitis, endometritis, early abortion and pyometra. The disease causes widespread economic loss over most of Europe, the United States and Japan. In the outbreak described Gould states that the loss amounted to over £2,000. The history and symptoms of the disease are given in some detail. Briefly, the first indication that the disease is present in a herd is a history of breeding difficulties in general and that several animals have returned to the bull after having passed one or two œstral periods and been thought safely in-calf. Abortion usually occurs between the first and fourth month, and the fœtus is generally expelled in the intact membranes, all signs of putrefaction being absent both in the fœtus and fluids. This is followed by a discharge in which *T. fœtus* is easily demonstrated. Not all cases, however, abort, *e.g.*, the fœtus may be retained *in utero*, and pyometra supervene. In this latter type of case nothing amiss may be suspected until nine months or more have elapsed since the last service. Rectal examination will, however, reveal that the uterus, though enlarged in size, does not contain a fœtus. When such a cow is killed the uterus is found to be filled with thick, odourless pus, in which the trichomonads are easily demonstrated.

For the purpose of diagnosis fresh material is best; a small drop of material is examined as a hanging drop preparation or between slide and cover-glass with one-sixth inch lens. Diagnosis is usually easy where an abortion has recently occurred and in pyometra cases. In chronic cases without marked metritis or pyometra the organisms are very few in number and there is often great difficulty in detecting them. In the fresh preparations *T. fœtus* appears as an actively motile pear-shaped organism about 12μ long, with three anterior flagella, an undulating membrane, and a posterior filament.

All observers have agreed that the disease is transmitted by the bull at service, and that prevention and control, therefore, are largely based on proper breeding hygiene. For treatment of individual cases, Gould used various antiseptic irrigations. He found that douching with 2 per cent. Lugol's solution was useless.

Intra-uterine injections of lactic acid (1 to 3 per cent.) resulted in diminution of the discharge, and with repetition of the treatment at five-day to seven-day intervals, return to normal occurred after three to five treatments. The bulls involved were douched once a week with a 5 per cent. solution of lactic acid. (For the detailed history of the outbreak, the methods of cultivation, and the pathological histology of *T. fœtus* infection the reader is recommended to consult the original article.)

Dorssen, Dr. C. A. Van.—*Tdschrft. v. diergenskunde*, Jan. 1st, 1937.

THE author carried out experiments on infectious pseudo-membranous enteritis in cats. Most of the cats, also the young ones, appeared to be insusceptible to this disease. Only in a few cases the author succeeded in transmitting the disease to cats (by subcutaneous infection or *per os*). In two cases typical pseudo-membranes were present. The period of incubation was in those cases about fourteen days. Twenty-one cases were subjected to bacteriological examination. From a few post-mortems no micro-organisms could be isolated ; from the others, coli bacilli, streptococci, staphylococci, once alcaligenes and once *S. typhimurium* were cultivated. Ætiological value is not attributed to these micro-organisms. The author's experiments confirm the recent publications that this disease is caused by a filtrable virus.

Jansen, Dr. Jac.—*Tdschrft. v. diergenskunde*, Jan. 1st, 1937.

AFTER an injection with formalised vaccine against swine-plague, a number of pigs died of phlegmonous inflammation emanating from the place of injection. The Novy bacillus (*B. œdematis maligni* No. II, *B. œdematiens, clostridium novyi*) appeared to be the cause. This bacillus was demonstrated in the rest of the vaccine which had remained in the bottle. It could not be demonstrated whether the vaccine before use contained already this germ or not, no other unopened bottle being left.

Bos, Dr. W.—*Tdschrft. v. diergenskunde*, Jan. 15th, 1937.

ACETONIA is nearly exclusively met with in high-yielding dairy cows, and when kept indoors ; especially from one to four weeks after calving. The cause of acetonuria must be sought in an abnormal fat metabolism in the liver. Calcium chloride in doses of 30 grammes daily in a 50 per cent. solution has a favourable influence on the course of the disease. In most cases an intravenous injection of 20 c.c. of tonophosphan (Behringwerke) has favourable results, probably due to the influence of phosphorus on the liver-metabolism. Sometimes a second injection is required. In most cases spontaneous recovery occurs when the cattle are put out to pasture.

Veterinary Advice by Radio in the U.S.A.

A RADIO compaign over twelve mid-western stations, urging farmers to have their hogs vaccinated against cholera by a veterinarian, is being launched this month as a new development in the educational campaign sponsored by the

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Associated Serum Producers. The announcements will begin around weaning time for pigs and will continue through June. The radio copy emphasises the dangers of hog cholera, the wisdom of having spring pigs vaccinated around weaning time, and the importance of having the vaccinating done by a veterinarian. The Associated Serum Producers have also announced plans for a new series of summer radio talks, to take up summer diseases of livestock, and to be presented starting in June or July over leading college and commercial stations.

Reviews

The Fifth Progress Report of the Foot-and-Mouth Disease Research Committee.

THE Fifth Progress Report of the Foot-and-Mouth Disease Research Committee has just been published. It shows a large amount of research work carefully done with a view to preventive measures, but, unfortunately, up to the present nothing definite has been discovered.

Resistance of the Virus to Heat.—Experiments with dried milk showed that the virus is killed by the roller process, but might survive in the spray process. Tests were carried out by inserting the virus into sweetbreads, *e.g.*, thymus. The conclusion was reached that when the organ was small and placed in cold water, which was then heated, there was a margin of safety if the time taken to raise the water to boiling point was twelve to thirteen minutes and continued for five minutes, but with large specimens then the procedure was not enough to kill the virus.

Hyper-immune Serum.—Experiments showed that the serum used, even in large doses, did not protect cattle or pigs artificially infected or when exposed for twenty-four hours to contact with an infective animal. The serum gave little or no protection against the standard types O and C, but better results against the standard type A. The results suggest that not only is the serum which was examined of low potency, but that it would not have any influence on infections with some of the strains met with in this country.

Immunity.—Experiments in producing immunity by vaccination have given some hopeful results, but the Committee cannot recommend it to replace the present slaughter policy in Great Britain. An effective vaccination might be used in countries where the disease is enzootic and from which animal products are exported to the United Kingdom. Experiments are being continued, utilising a new animal, namely, hedgehog, as laboratory animals. In the United States, Scandinavia, Switzerland and Denmark rigorous stamping out is practised when outbreaks of foot-and-mouth disease occur. In France, Holland and Belgium isolation of outbreaks is practised, and to some extent preventive treatment with serum is used. In Germany, isolation of all in-contact animals with living virus modified by using simultaneous injections of the polyvalent hyper-immune serum. Pirbright experiments show that inoculation of such serum as is at present available cannot be relied on to protect a bovine from infection when intimately exposed to a highly-infected case of disease.

Eradication.—Dr. Flückiger, of Switzerland, suggests that an International concerted policy of slaughter would appear to be the best means of exterminating the disease throughout Europe, and that no other method will suffice.

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Outline of the Clinical Diagnosis of the Internal Diseases of Domestic Animals. By Dr. B. MALKMUS, edited by Dr. TH. OPPERMANN. Twelfth edition. (Klinische Diagnostik der Inneren Krankheiten der Haustiere). Leipzig : Dr. Max Jänecke. 1937. 75 Illustrations in the text and 1 Coloured Plate. Price Mk. 6.41. An English edition of this book, revised by J. R. Mohler, V.M.D., D.Sc., and A. Eichhorn, D.V.S., is published by Baillière, Tindall and Cox, at 15*s*.

THE fact that this book has gone into its twelfth edition is a proof that it has been in demand and appreciated. It gives in a compressed form the many-sided points of consideration necessary to confirm and establish the symptoms and significance of cases of illness. It contains the results and conclusions of collective veterinary experience. The usefulness of bacteriological investigation and inoculation in determining clinical diagnosis is advised and discussed. A short description of the most frequent diseases and the disturbances of function usually occurring in them is given. The book is not intended as a big and comprehensive work of reference on the subject, but as a help to the general practitioner in pointing out the chief signs and portents of departure from normal health in order to enable him to make a correct diagnosis of disease and adopt suitable measures to deal with it. Some of the contents of the book comprise methods of examination of the existing state of the patient, referring to the external appearance, habit, skin, ocular mucosa, body temperature. Examination of the circulatory, respiratory, digestive, urinary, sexual and nervous apparatuses. Diagnosis by observing gait and bodily movements, diagnostic inoculations and serologic examinations, lymph nodes and lymph vessels, and the blood and its diseases, are all covered.

Die Zahnfachentzundung des Pferdes (Alveolar Disease of the Tooth in the Horse). By HANS JURGEN VOSS. Pp. 112. 22 Illustrations in the text. Stuttgart : Ferdinand Enke. 1937. Price Mk. 14.

THE effects of alveolar inflammation in the horse are well known, and the author throws light on the many forms and causes of it. He has searched literature, examined the blood, used röntgen rays and made histological examinations in his consideration of the subject. There are twenty-one figures in the text and one coloured plate which illustrate the abnormalities met with in diseases of the teeth and alveoli. The book is quite a good one on the subject. A chapter might be added to it with advantage advising on the correct breeding and feeding of equines to avoid in some measure the occurrence of alveolar disease.

Parliamentary News

AGRICULTURAL POLICY.

MR. ATTLEE : to ask the Minister of Agriculture if he is now in a position to make a statement with regard to agricultural policy.

MR. MORRISON : I am glad of this opportunity to make a statement.

The Government have very carefully considered the position of agriculture from the points of view of the welfare of agriculture itself, national defence, and the importance of maintaining continuity in our agricultural policy that is designed

to ensure maximum supplies for the consumer consistent with reasonable remuneration for the producer. The Government have in the past initiated proposals for dealing with particular agricultural products. This side of the Government's policy will continue and I hope shortly to announce proposals for the future of the milk and pig industries. There are, however, certain fundamental matters with which I wish to deal in the following statement.

In regard to defence, I should like at the outset to stress the following considerations: The two objectives—of producing the maximum quantity of food to meet our requirements in time of war, on the one hand, and of the efficient development of our agriculture in time of peace, on the other—not only demand very different methods, but to a material extent are opposed to each other. In particular, a drastic policy of food production for war purposes would entail the ploughing up of an extensive area of our grassland for the purpose of growing cereals and other crops for human consumption. In peace time, however, livestock husbandry, which is the foundation of our agriculture, is naturally based on a grassland system on account of the physical and climatic advantages which favour it. The Government has had to determine where, between these two objectives, the path lies which, on balance, it would be wise to follow.

In the opinion of the Government, to put agriculture on a war-time footing, with all the regulations, the regimentation of the farming community, and the heavy costs that it would unavoidably involve, would not be practicable at the present time; nor in their opinion is the situation such as to require the adoption of this course in time of peace. The Government are equally satisfied that considerations of national defence would not justify a policy in peace time of stimulating agricultural production to such a pitch that the country would be faced with a highly artificial situation which would sooner or later have to be liquidated if the emergency did not arise. Such a policy would be costly to build up and costly to close down. Moreover, farmers themselves will have a vivid recollection of the disorganisation and uncertainties which followed the repeal of the Corn Production Acts in 1921, and the Government have no wish to put them in such a position again.

Having regard to these considerations, the Government are satisfied that the best course in the general national interest is to continue their efforts to improve the general prosperity and efficiency of home agriculture, and in particular to promote an increase in the fertility and productivity of our soil. The proposals which I shall now outline are so designed that should an emergency arise we should be in a position immediately to take advantage of improved fertility, but should it not arise, we should be increasing the productivity of our land and stock by means which are consistent with, and not opposed to, the normal development of our agriculture on economic lines in time of peace.

To achieve this object, the Government propose that the following measures should be taken:

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Grassland Improvement.—In a policy aimed at raising the fertility and productivity of our soil the improvement of our grassland must be an objective of fundamental importance. Grass forms one of our greatest natural resources, and it is in the national interests that it should be more fully and profitably utilised in time of peace and be a reservoir of fertility for an emergency. By the Livestock Industry Bill at present before Parliament and the arrangements for regulating supplies of livestock and meat to this market, the Government are seeking to promote the prosperity and efficiency of the livestock industry. The Government believe that this measure and those now proposed for drainage and for the increased use of lime and basic slag will lead to a marked improvement in the grassland of this country. The Government are also alive to the potentialities of dried grass as a possible addition to home-grown supplies of feeding stuffs. They are accordingly encouraging further experiments in grass drying.

Eradication of Animal Diseases.—The Government also propose to initiate a large-scale and more comprehensive campaign for the eradication of animal diseases in Great Britain. Our object is to improve the health of our livestock and increase agricultural productivity by seeking to eliminate what is perhaps the worst of all forms of wastage and economic loss in agriculture. In the first instance efforts will mainly be directed to the eradication of diseases among cattle. The scheme will involve an additional charge on the Exchequer of about £600,000 per annum for the first four years. It will, however, involve centralisation of public veterinary services, and as against the increased cost to the Exchequer, the expenditure by local authorities will be reduced by about £170,000. Parliamentary authority will be required for these proposals. The Government are anxious, however, to lose no time in developing the existing schemes of control of disease and accordingly I am arranging at once to amend the Attested Herds Scheme under the Milk Act, 1934, by providing additional assistance in England and Wales, as has already been done in Scotland, to owners of dairy stock who are desirous of eradicating tuberculosis from their herds. This revised scheme will become operative on June 1st, next.

In the opinion of the Government the proposals which I have outlined, by increasing the productivity of our agriculture not only will enable it better to meet the situation in the event of war, but will be a substantial aid towards raising efficiency, lowering costs and establishing the industry on a sounder economic foundation in time of peace.

The necessary legislation to give effect to these proposals will be introduced at the earliest possible moment.

Preparations and Appliances

FELINE DISTEMPER VACCINE.

RESEARCHES have been carried out during the past few years at the Wellcome Physiological Research Laboratories on cat distemper, during which it was found that injections of the vaccine produced in cats an immunity which lasted several weeks. A large number of cats have been inoculated, and it has been shown that, although exposed to infection, as, for instance, while travelling and at shows, the animals have in almost every case escaped the disease. A vaccine prepared by the Wellcome Physiological Research Laboratories is now issued by Burroughs Wellcome & Co., and is designed for the prophylactic treatment of cats which are apparently in perfect health and which have not been exposed to infection for some weeks. It should be noted that the vaccine is not intended for the treatment of cats which have been brought into recently infected premises. Animals which have to be removed should be injected before such removal. The dose of the vaccine is 1 c.c. subcutaneously, given in any convenient site, followed by another 1 c.c. seven to ten days later. The timely introduction of this vaccine will no doubt be much welcomed by veterinarians, especially those whose patients include cats of the more valuable breeds—particularly Persian and Siamese cats—whose mortality from cat distemper is high. 'Wellcome' Brand Feline Distemper (Enteritis) Prophylactic Vaccine is supplied only to veterinary surgeons. It is issued in germ-proof containers of 1 c.c.

Obituary

DR. E. L. QUITMAN, Chicago.

THE profession in England will regret to hear of the death of Dr. Edwin L. Quitman, whose work for the veterinary profession in America was almost as well known here as on the other side of the Atlantic. Born in 1870, son of a veterinary practitioner in Chicago, Dr. Quitman graduated from the Chicago Veterinary College in 1891, being shortly afterwards appointed to the Chair of Materia Medica and Therapeutics, a position he retained until the College closed in 1920. He was for several years Dean of the Faculty, but at the same time carrying on a large private practice in the city. Popular in his profession equally with his students and his colleagues, he wrote many original articles in the American journals, and was always ready at the call of the veterinary societies in that country on requests for addresses on the actions of drugs, and also, especially in later life, for demonstrations of surgical subjects. Although well known as a fighter in debate, his opinion, though sometimes rather original, was always respected. He is a man who will be much missed by his colleagues in the veterinary profession.

News

TUBERCULOSIS (ATTESTED HERDS) SCHEME (ENGLAND AND WALES).

As foreshadowed in the statement of agricultural policy made by the Minister of Agriculture and Fisheries in the House of Commons on May 27th, the Minister has amended the Tuberculosis (Attested Herds) Scheme (England and Wales) dated January, 1935, by the issue of a revised scheme which supersedes it as from June 1st,

1937. The purpose of the new scheme, which adheres to the principles on which the earlier scheme was based, is to encourage the addition of increased numbers of herds to the register of herds officially certified to be tuberculosis-free, by the offer of additional financial inducements to owners of cattle herds to qualify for a Certificate of Attestation.

The conditions which a herd must satisfy before a Certificate of Attestation will be issued and the herd entered in the Register of Attested Herds kept and published by the Ministry, remain as heretofore, *viz.*, the herd must pass an official test, and this test in turn will be applied only if the herd has passed the two preceding herd tests carried out by the owner's veterinary surgeon at the stipulated intervals without any reactors being found. The principal amendments contained in the new scheme are as follows :

(1) Any owner having a herd of cattle which has been tested with tuberculin and has been found to contain not more than a certain specified proportion of reactors (about 10 per cent.) may, if the reactors have been disposed of, apply to the Ministry for financial assistance towards the cost of further tests (up to a maximum of four complete herd tests) with a view to completing the eradication of tuberculosis from his herd and applying for a Certificate of Attestation. The contribution payable by the Ministry in respect of each of these " assisted " herd tests will be at the maximum rate of 2*s.* 6*d.* per head of cattle tested, plus a sum of £1 1*s.* per herd, but the contribution will in no case exceed the amount of the charges made by the veterinary surgeon who carries out the tests. It is intended that these assisted tests shall be carried out by a veterinary surgeon employed by the owner of the herd, but the arrangements for the tests must be submitted to the Ministry beforehand for approval.

(2) In any case in which a herd fails to pass the official test required before a Certificate of Attestation can be issued, the owner, instead of having his application rejected as at present, will have the opportunity of applying for further official tests at the expense of the Ministry up to a maximum of three complete herd tests (making four official tests in all). When the whole herd passes one of these tests a Certificate of Attestation will be issued.

(3) Herds which have been accepted for " assisted " tests or for additional official tests mentioned in the two preceding paragraphs will be known as " supervised " herds, and their owners will be required to observe certain rules (set out in the second schedule to the scheme), dispose of reactors, and disinfect the premises. These rules vary somewhat from those applicable to attested herds, but are designed with the same object, *viz.*, to protect the herd from the risk of infection by contact with cattle which are on adjoining premises or which may be added to the herd.

(4) The interval required to elapse between any of the qualifying tests for attestation has been shortened to one of from sixty to ninety days, thus enabling herd owners to achieve attestation in a shorter time than formerly.

(5) Provision is made whereby official tests (other than those for the purpose of deciding whether a Certificate of Attestation may be granted in the first instance) may be carried out by veterinary practitioners nominated by the Ministry. These are the tests required at certain intervals to satisfy the Ministry of the continued freedom of the herd from tuberculosis before a Certificate of Attestation is renewed. All official tests will be at the expense of the Ministry.

The direct advantages to herd owners of entering the scheme of attestation lie in the provision by the Ministry of free tests, together with a bonus of 1*d.* per gallon on all milk from the herd sold through the Milk Marketing Scheme. The advantages of owning a tubercle-free herd do not by any means end here. The wastage of cattle due to the ravages of tuberculosis is considerable, and the Attested Herds Scheme affords a means of protection against such wastage. As proved at recent sales, animals

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coming from known tubercle-free herds command substantially higher prices than animals from herds in respect of which there is no such guarantee.

It will be seen from the foregoing that the Ministry proposes to make increased use of the services of veterinary practitioners in connection with the new scheme. Not only is it intended that the owner's veterinary surgeon shall carry out the "assisted" tests described in (1) above, but it is also proposed to employ private practitioners for a proportion of the official tests to be carried out at certain intervals after attestation, to satisfy the Ministry as to the continued freedom of the herd from tuberculosis. This procedure is already followed in Scotland, and the scale of fees to be paid to veterinary surgeons for carrying out the post-attestation tests will be similar in both countries. Applications for further information in regard to the scheme should be addressed to the Secretary of the Ministry, Whitehall Place, London, S.W.1.

CAREER AIDS FOR STUDENTS: CITY CHURCH'S CHARITY GRANTS AVAILABLE UNDER WILL DATED APRIL 26th, 1697.

MORE boy and girl applicants are wanted at once by the Trustees of a most helpful but little known charity administered by St. Dunstan's-in-the-West, Fleet Street, London, E.C.4, under the terms of a will dated April 26th, 1697.

"Our funds are accumulating," said the Rev. A. J. Macdonald, D.D., the Rector of St. Dunstan's, recently, "and therefore excellent opportunities are being missed by certain parents of forwarding the careers of their children—both boys and girls. The Trustees (of whom I am one) are in a position to make grants from a minimum of £10 to a maximum of £100. Such grants are for the provision of professional articles, trade apprenticeships, outfits, technical books, fees for instruction and travelling expenses for poor children, under twenty-one years of age, whose parents are either Freemen of the City of London, or have resided in the City for not less than five years, irrespective of present residence. This latter important qualification is part of the broadening out of the Charity (John Land for Widows and Children of poor Freemen of the City of London) which we succeeded in obtaining some three years ago. One beneficiary recently won a classical scholarship at St. John's College, Cambridge, and the John Land Trustees supplemented this by a bursary of £50 for two years. On the other hand, £50 has been paid to apprentice a boy to the plumbing trade in the City of London. Not long ago we apprenticed the son of a butler who is a Freeman of the City of London and resident in Canada. Trades to which boys have lately been apprenticed include printing, boot-making and sign-writing. Substantial yearly wage increases are specified in the indentures, and personal inquiries are made as to all apprentices being properly taught, and as to their good conduct and diligence. Forms of application may be obtained from Mr. B. G. Geer, St. Dunstan's Vestry, Fleet Street, E.C.4. I would like to emphasise that there are *no* vacancies in the Widows' branch of this charity."

OLYMPIA HORSE SHOW. OFFICERS OF EIGHT ARMIES TO JUMP FOR ROYAL CUPS; ENGLISH, FRENCH AND RUSSIAN RIDING DISPLAYS.

UNDER the patronage of King George VI, the twenty-fifth International Horse Show will be held at Olympia, London, from Thursday, June 17th, to Saturday, June 26th, with performances each afternoon and evening. There is every indication of a highly successful effort. Boxes and seats are in lively demand, the number of classes has been increased, there is a splendid entry of the finest bloodstock, and uniformed officers of eight nations will figure in the jumping competitions, a record

in the history of the show. There will be gala performances on Monday afternoon, June 21st, when T.R.H. The Duke and Duchess of Gloucester will see jumping for the Edward Prince of Wales' gold challenge cup, and on Thursday afternoon, June 24th, when officers of the Armies will compete round the course for the King George V gold trophy. Special features will be provided by Le Cadre Noir, superb horsemanship by fourteen officers from the French Cavalry School, Saumur; Cossacks of the Russian Army with their thrilling pyramid gallop, a vigorous demonstration by youthful experts of Canford School, and indoor polo. Other outstanding events are the coaching marathon, two high jumps, the Scurry Stakes, an exciting steeple-chase, children's jumping trials, officers' chargers, hunt teams, mounted police, trade turn-outs and the costers' carnival to find the best donkey in London.

IRISH SCHOLARSHIPS.

THE Department of Agriculture of the Irish Free State offers scholarships to candidates who wish to specialise in general agriculture, dairy science, veterinary science and horticulture. They are tenable subject to satisfactory progress. For students who are working for the diploma of M.R.C.V.S. particulars can be obtained, post free, from the Secretary, Department of Agriculture (Section 23), Dublin.

CARNEGIE GRANTS FOR RESEARCH AND TRAVEL.

AMONGST the list of selected officers we are pleased to see the name of Mr. W. Fotheringham, Veterinary Research Officer, Kenya, for a course of study in pathology and bacteriology at the University of Edinburgh and at the Royal Veterinary College, London, particularly in relation to the respiratory diseases of sheep. It is understood that further grants in the present series will be made from time to time.

VETERINARY EDUCATION COMMITTEE.

THE Secretary of State for Scotland and the Minister of Agriculture and Fisheries have appointed Dr. W. L. Burgess, F.R.C.P., Dr. W. R. Wooldridge, M.Sc., M.R.C.V.S., Sir Louis J. Kershaw, K.C.S.I., C.I.E., and Professor Sir Joseph Barcroft, C.B.E.,M.A., F.R.C.S., to be members of the Committee set up in November, 1936, to review the facilities available for veterinary education in Great Britain. Thomas Loveday, Esq., M.A., LL.D., Vice-Chancellor of the University of Bristol, has been appointed Chairman.

Personal

PROFESSOR H. D. KAY, O.B.E., Ph.D., D.Sc., Director of the National Institute for Research in Dairying, Shinfield, near Reading, has been appointed as Technical Adviser (part-time) in Dairying to the Ministry of Agriculture and Fisheries. He will advise on the technical aspect of the various problems of milk production and manufacture which arise in the course of the Ministry's work.

MR. J. EDWARDSON has been appointed as whole-time inspector in succession to Mr. J. King Shaw, who resigned from the position of veterinary inspector for East Sussex, and the following additional veterinary inspectors have been appointed:

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Mr. J. W. Pearce and Mr. D. H. MacDonald. Their salaries are to be £400 per annum, rising by annual increments to £25 to £500, with travelling expenses and personal allowances of £215 per annum.

Amongst recent wills, we notice the names of Major Leslie Lyne Dixson, late R.A.V.C., whose will has been proved for £38,596, with a net personalty of £25,841.

At a meeting of the Royal Agricultural Society Council recently held in Preston, a grant of £100 towards the new Animal Operating Theatre in the London Royal Veterinary College was approved.

CORRECTION.

In the Personal Column of our April issue it was stated that the late Miss Cust had left a legacy of £500 to the Royal College of Veterinary Surgeons for the purpose of founding a Research Scholarship. This amount should have been stated as £5,000.

Publishers' Notices

All communications should be addressed to 7 & 8, Henrietta Street, Covent Garden, London, W.C. 2. Telephone: Temple Bar 8568. Telegrams: "Baillière Phone, London."

Letters for the Journal, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required, not later than the 23rd.

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